

AIR EXPOSURE MONITORING OF EHAP PERSONNEL
DURING A TELONE II SOIL TRANSLOCATION
STUDY IN FRESNO COUNTY

by

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SUMMARY

Personnel from the California Department of Food and Agriculture's Environmental Hazard Assessment Program Unit were engaged in a soil translocation study that would expose them to unknown and potentially hazardous levels of volatilized Telone II during soil core collection. At that Unit's request, Worker Health and Safety conducted personnel air monitoring to establish the severity of toxic exposure. Results showed a low level of Telone II in the air. At no time did the exposure level appear to rise above the American Conference of Governmental Industrial Hygienists recommended Threshold Limit Value of 1 ppm.

INTRODUCTION

In October 1984, the Environmental Hazard Assessment Program (EHAP) Unit of the Department of Food and Agriculture conducted a study on Telone II and its ability to translocate through soil. The study involved the procurement of soil core samples from a freshly treated field. This sampling procedure would expose the EHAP personnel to Telone II gas of unknown concentrations. Therefore, the Worker Health and Safety (WH&S) Unit was requested to do an employee air-monitoring study to determine the amount of Telone II to which EHAP personnel would be exposed. Not only would this monitoring provide EHAP with information regarding their personnel's toxic exposure, but it would also contribute to a WH&S data base on possible field-worker exposure from field off-gassing.

METHODS AND MATERIALS

Telone II (1,3-dichloropropene) is a nematicide often used for pre-plant soil fumigation. The registrant, Dow Chemical, had arranged with EHAP to perform a soil translocation study. This study would involve the removal of soil core samples immediately after application and on subsequent days thereafter. The soil sampling would upset large quantities of fumigated soil, releasing Telone II into the air and increasing the amount of material in the air above levels associated with normal field off-gassing. Therefore, air monitoring of personnel was required to ascertain their exposure to this unknown concentration of material.

Air was drawn through charcoal tubes (SKC #226-09, 400/200 mg.) using MSA Fict-Flo personnel air sampling pumps initially calibrated for 1 litre per minute using a Kurz 590S Mass Flow Calibrator. The charcoal tubes were connected to the pumps using Tygon plastic tubing. Pumps were checked at the end of each sampling to determine if there had been a change in air flow. Changes were noted on the appropriate data sheet.

Samples were of two types; personnel and area. The personnel sampler was located on workers who would have the highest potential for exposure; in this case the drill operators. These workers were constantly working in the immediate area of the drilling and were in closest proximity with the disturbed soil. The area sample was sited at the end of the drill rig so that it was always located by the area of the most intense soil disturbance.

The personnel samplers were put on different operators each day to minimize the inconvenience to one worker. Both workers performed essentially the same function.

Samples were collected in roughly hourly intervals. However, in the case of the first day's pre-drilling and last-drilling samples and on the second day's pre-lunch drilling, the sampling periods were considerably shorter than one hour. This was necessary on the pre-drilling sample since that specific job interval lasted for less than one hour; on the other two samples, the end of the work period did not coincide with the projected end of the sampling interval, resulting in shortened sampling times.

At the end of each sampling period, the collected samples were removed from the field for processing. The pumps were checked for changes in flow rate

then shut off and the sampling tube removed. The sample tube was capped and stored on dry ice for later analysis by Sacramento's Chemistry Laboratory Services. Each day's collection of tubes were stored in separate bottles. An uncapped travel control tube was added to both bottles to detect if any material was in the storage bottles or migrating from the individual sample tubes. Additionally, a control tube was opened and left in the vehicle for seven hours. It was then capped and stored with the first day's samples.

RESULTS

Each day's analytical results are shown in Table One and Two. The jobs performed during each sampling period are noted. Time Weighted Averages (TWA) for each worker and each area sample are shown in Table Three.

DISCUSSION

The 1984 Threshold Limit Value (TLV) for dichloropropene, as recommended by the American Conference of Governmental Industrial Hygienists (ACGIH) is 1 ppm TWA, considering skin exposure. There is no inhalation standard established by CDFA. However, using the ACGIH's TLV, all sampled air values were below the TLV and, consequently, all TWA calculated values were below the TLV. The highest TWA was from a personnel sample, with a TWA of 0.191 ppm, which is 19% of the TLV. Telone II dermal exposure hazard was of negligible concern since these workers were sampling post-fumigated soil and had no contact with the liquid. Since all personnel were fitted with adequate respiratory protection, it is unlikely that they had any significant inhalation exposure.

TABLE ONE
DAY ONE: TELONE II ANALYTICAL RESULTS

| <u>TIME/ACTIVITY</u> | <u>PPM</u> | <u>mg/m³</u> |
|---|------------|-------------------------|
| 0000/Background control | ND | ND |
| 0000/Travel control | ND | ND |
| 0923/Pre-drilling (p) 0953 | .0663 | .3037 |
| 1000/First hour drilling (p) 1103 | .0921 | .4217 |
| 1000/First hour drilling (a) 1100 | .051 | .2339 |
| 1104/Second hour drilling (p) 1144 | .0263 | .1203 |
| 1101/Second hour drilling (a) 1144 | .0214 | .0982 |
| 1306/Third hour drilling (p) 1410 Post-lunch | .391* | 1.790 |
| 1306/Third hour drilling (a) 1404 Post-lunch | .211 | .9679 |
| 1411/Fourth hour drilling (p) 1511 | .283 | 1.296 |
| 1406/Fourth hour drilling (a) 1506 | .218 | 1.000 |
| 1511/Fifth hour drilling (p) 1609 | .247 | 1.130 |
| 1507/Fifth hour drilling (a) 1609 | .139 | .637 |
| 1606/Sixth hour drilling (p) 1633 Clean-up | .135 | .6173 |
| 1606/Sixth hour drilling (a) 1633 Clean-up | .153 | .6996 |

ND = None Detected (Minimum Detectable Level is 0.2 ug)

(a) = area sample (p) = personnel sample

* highest detected level on this day

TABLE TWO
DAY TWO: TELONE II ANALYTICAL RESULTS

| <u>TIME/ACTIVITY</u> | <u>PPM</u> | <u>mg/m³</u> |
|---|------------|-------------------------|
| 0000/Travel control | ND | ND |
| 0857/Pre-drilling (a) 0957 | .517 | 2.370 |
| 0857/Pre-drilling (p) 0957 | .667* | 3.056 |
| 0957/First hour drilling (a) 1059 | .285 | 1.308 |
| 0957/First hour drilling (p) 1059 | .524 | 2.402 |
| 1059/Second hour drilling (a) 1118 | .255 | 1.170 |
| 1059/Second hour drilling (p) 1118 | .332 | 1.520 |
| 1224/Third hour drilling (a) 1324 Post-lunch | .050 | .2315 |
| 1224/Third hour drilling (p) 1324 Post-lunch | .096 | .4386 |
| 1324/Fourth hour drilling (a) 1424 | .046 | .210 |
| 1324/Fourth hour drilling (p) 1424 | .054 | .249 |
| 1424/Fifth hour drilling (a) 1519 Clean-up | .044 | .202 |
| 1424/Fifth hour drilling (p) 1519 Clean-up | .070 | .3232 |

ND = None Detected (Minimum Detectable Level is 0.2 ug)

(a) = area sample (p) = personnel sample

* highest detected level on this day

TABLE THREE
TIME WEIGHTED AVERAGES

Day One

| | | |
|------------------|-------|-----|
| Personnel Sample | 0.143 | ppm |
| Area Sample | 0.087 | ppm |

Day Two

| | | |
|------------------|-------|-----|
| Personnel Sample | 0.199 | ppm |
| Area Sample | 0.129 | ppm |